ABSTRACT

An optical network has: sections for establishing optical paths; a plurality of optical edge routers for connecting external IP networks to the optical network (1001); and a plurality of optical cross connects, for connecting the optical edge routers by the optical paths, having switching sections with respect to an optical pulse unit. In the optical network, each of the optical edge routers has both of: (1) an optical network control instance (INSp) for maintaining topology information in the optical network and switching/signaling the optical paths; and (2) an IP network instance (INSi) for maintaining a routing table in each of the external IP networks and activating routing protocols between the external IP networks and the IP network instance. By doing this, it is possible to realize a multi-layer cooperative function and provide highly safe optical networks, etc.